FIG. 5A illustrates a temperature detection module 250 as a second embodiment of temperature detection module 50. Temperature detection model 250 includes a damper temperature estimation module 251 for receiving operating temperature signal OT_{S1} (FIG. 2) in the form of ambient temperature signal AT_{S1} and a plurality of signals 252 indicative of various operating conditions of MR damper 10 (e.g., a damper force/current and a damper velocity). In response to a reception of ambient temperature signal AT_{S1} and signals 252, damper temperature estimation module 251 provides an estimated damper temperature signal ET_S as a computation of an execution of a thermal energy model method of the present invention.

FIG. 5B illustrates a flowchart 350 as a representation of the thermal model method. Damper temperature estimation module 251 determines a current thermal energy state of MR damper 10 during stage S352 of flowchart 350. In one embodiment, damper temperature estimation module 251 determines an initial energy consumption by MR damper 10 during an initial operation of MR damper 10 to thereby establish an initial thermal energy state of MR damper 10. Thereafter, damper temperature estimation module 251 downwardly adjusts the initial thermal energy state of MR damper 10 in view of various cooling effects upon MR damper 10 between operations of MR damper 10 and upwardly adjusts the thermal energy state in view of additional energy consumption by MR damper 10 during subsequent operations of the MR damper 10. Those having ordinary skill in the art will appreciate various ways for determining energy consumption of MR damper 10 during operations of MR damper 10 and various cooling effects upon MR damper 10 between operations of MR damper 10 as well as the required signals 252.

The current thermal energy state is therefore the current summation of the total energy consumption by MR damper 10 and the total cooling effects upon MR damper 10 as of the instance damper temperature estimation module 251 implements stage S352. During a stage S354 of flowchart 350, damper temperature estimation module 251 determines a delta temperature T corresponding to the current thermal energy state of MR damper 10. In one embodiment, experimental data correlating delta temperatures to thermal energy states of MR damper 10 can be generated and stored whereby the experimental data can serve as a basis for a computation or retrieval of delta temperature T corresponding to the current thermal energy state of MR damper 10.

During a stage S356 of flowchart 350, damper estimation temperature module 251 generates estimated temperature signal ET_S as a summation of ambient temperature signal AT_{S1} and delta temperature T. The execution of flowchart 350 by damper temperature estimation module 251 can be discontinuous as shown, or continuous as indicated by the dashed arrow.

Referring again to FIG. 2, an alternative embodiment of temperature damper controller 30 can omit temperature detection module 50 whereby operating temperature signal OT_{S1} in the form of ambient temperature signal AT_{S1} (FIG. 4) or damper temperature signal DT_{S1} (FIG. 4) is directly provided to temperature compensation module 60.

Temperature compensation module 60 provides operating current I_{OS2} in response to a reception of operating current I_{OS1} and operating temperature signal OT_{S2} (or alternatively operating temperature signal OT_{S1}). Operating current I_{OS2} is a function of the desired force level of the damping force of MR damper 10 as indicated by operating current I_{OS1} and the operating temperature of MR damper 10 as indicated by operating temperature signal OT_{S2} (or alternatively operating temperature signal OT_{S1}).

FIG. 6A illustrates a temperature compensation module 160 as one embodiment of temperature compensation module 60. Temperature compensation module 160 includes scale factor module 161 having data representative of a scale factor curve 162 for providing a scale factor signal SF_{S1} in response to a reception of operating temperature signal OT_{S2} (or alternatively operating temperature signal OT_{S1}). In generating scale factor signal SF_{S1}, scale factor module 161 implements a scale factor determination method in accordance with the present invention that is based upon operating temperature signal OT_{S2} (or alternatively operating temperature signal OT_{S1}). FIG. 6B illustrates a flowchart 260 that is representative of the scale factor determination method.

During a stage S262 of flowchart 260, scale factor module 161 determines if operating temperature signal OT_{S2} (or alternatively operating temperature signal OT_{S1}) is less than a temperature T1 (e.g., -20 C) as listed in scale factor curve 162. If so, during a stage S264 of flowchart 260, scale factor module 161 generates scale factor signal SF_{S1} equating scale factor SF1 as listed in scale factor curve 162.

Otherwise, during a stage S266 of flowchart 260, scale factor module 161 determines if operating temperature signal OT_{S2} (or alternatively operating temperature signal OT_{S1}) is less than a temperature T2 (e.g., 0 C) as listed in scale factor curve 162. If so, during a stage S268 of flowchart 260, scale factor module 161 generates scale factor signal SF_{S1} equating a computation of an interpolation equation illustrated in stage S268, which is a function of scale factor SF1, a scale factor SF2, temperature T1, and temperature T2 as listed in scale factor curve 162.

Otherwise, during a stage S270 of flowchart 260, scale factor module 161 determines if operating temperature signal OT_{S2} (or alternatively operating temperature signal OT_{S1}) is less than a temperature T3 (e.g., +20 C) as listed in scale factor curve 162. If so, during stage S272 of flowchart 260, scale factor module 161 generates scale factor signal SF_{S1} equating a computation of an interpolation equation illustrated in stage S272, which is a function of scale factor SF2, a scale factor SF3, temperature T2, and temperature T3 as listed in scale factor curve 162.